
2011 ANNUAL REPORT ARKWOOD, INC. SITE OMAHA, ARKANSAS

Prepared on behalf of:

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1.0 INTRODUCTION

This report presents a summary of the activities at the Arkwood, Inc. Site (Site) for the time period of January 2011 to December 2011. This is the annual activity report for the Site following source removal. The Site is located northwest of the intersection of Old Highway 65 and Cricket Road in Omaha, Arkansas (see Figure 1). Soil remediation for the Site was completed in 1995 and recognized by the USEPA and the State of Arkansas at the soil completion ceremony in July of 1996.

This Site is made up of a main approximately 20-acre area where wood-treating and treated-wood storage occurred historically. A spring, New Cricket Spring, is approximately one-quarter mile down the valley from the main area and is impacted by pentachlorophenol (PCP). Following source removal, activities have continued at the Site to evaluate concentrations of PCP at New Cricket Spring and to operate a remediation system that treats the water emanating from New Cricket Spring prior to release to Cricket Creek.

A pilot water injection system was installed in late 2005 at the Site. The pilot system was designed to inject groundwater or ozonated groundwater into the subsurface beneath the Arkwood Site to a depth of approximately 25 feet to maintain adequate flow through the spring and to treat residual concentrations of PCP that impact New Cricket Spring.

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2.0 OBJECTIVES

The goal of this report is to present the analytical results, analysis, and knowledge gained during the past year at the Site. Data and graphical presentations are included to allow an understanding of the residual PCP impact to the nearby New Cricket Spring following soil remediation (source removal) at the site in 1994 and 1995.

Analytical data from spring samples and the pilot injection system operating results have been tabulated and presented for evaluation and review.

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3.0 RAINFALL

Rainfall levels in 2011 increased from 2010 and were approximately 15% greater than the long term average annual rainfall and approximately 14% greater than the 2010 rainfall total. Annual rainfall for 2011 totaled 52.01 inches compared to the long term annual average rainfall of 45.2 inches. Annual rainfall in 2010 totaled 45.47 inches and in 2009 totaled 54.99 inches. Rainfall by month and average rainfall by month are shown on Table 3.1 and Figure 3.1. Review of the data in Table 3.1 shows that the majority of the rainfall in 2009 fell in the fall during September and October followed by two months of significantly below average rainfall. In 2010, significantly greater than average rainfall fell in July and September followed by significantly below average rainfall in August, October, November and December. In 2011, significantly higher rainfall amounts were reported in April and May and significantly lower rainfall amounts were reported in January, June and July. Based on observations, rainfall directly affects the observed flow rate in New Cricket Spring. If sufficient rainfall occurs that surface runoff develops, an increase in spring flow generally occurs within a few hours. Again, dependent upon the volume and duration of rainfall, the flow rate tapers over a period of a few days to “normal” flow rates.

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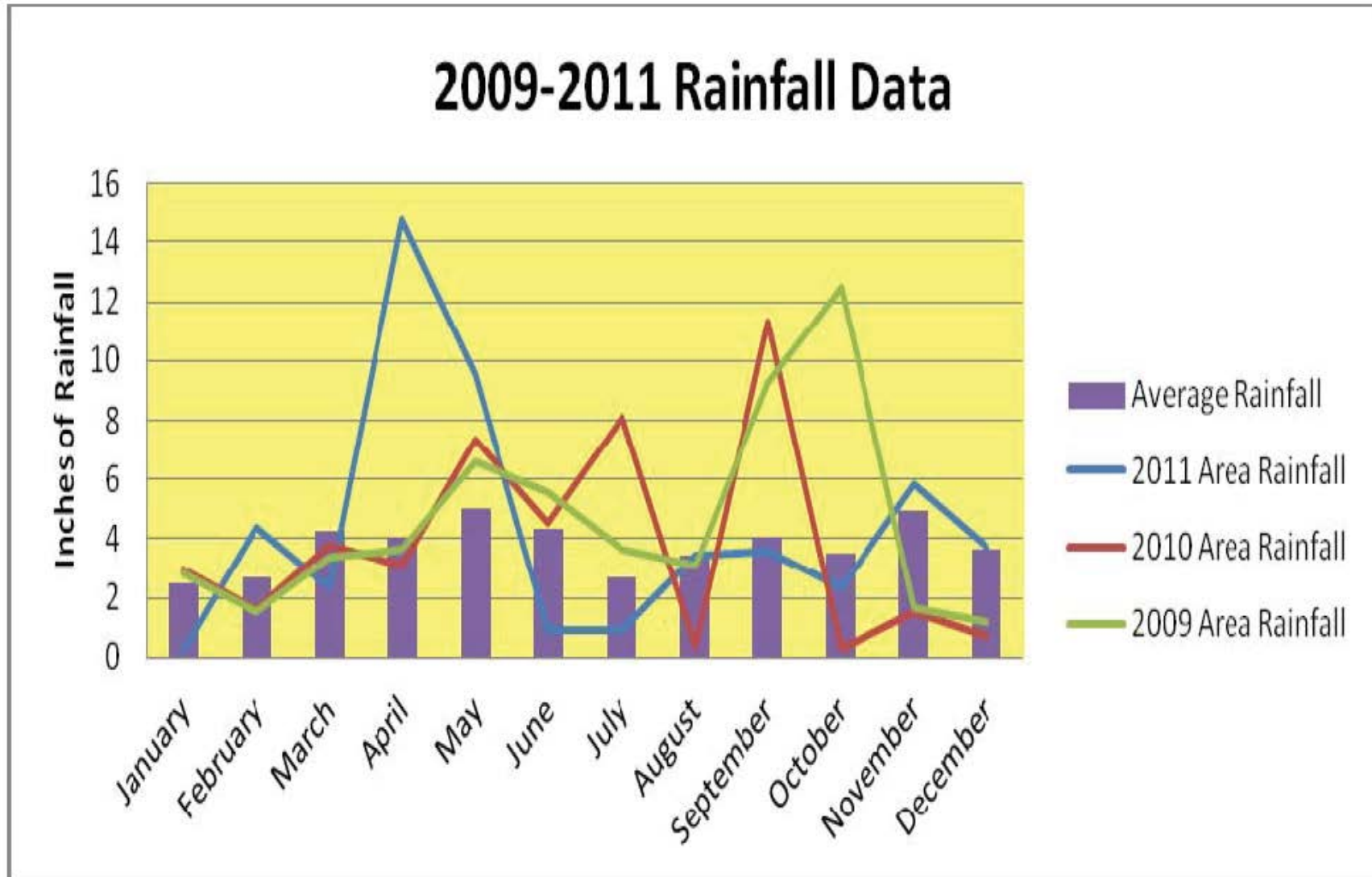
Table 3.1
RAINFALL 2009-2011

Month	2011 Area	2010 Area	2009 Area	Average
	Rainfall	Rainfall	Rainfall	Rainfall
January	0.25	2.94	2.85	2.51
February	4.43	1.61	1.51	2.71
March	2.35	3.8	3.34	4.29
April	14.73	3.08	3.65	4.09
May	9.51	7.32	6.62	5.01
June	0.93	4.51	5.59	4.34
July	0.91	8.07	3.66	2.72
August	3.41	0.34	3.12	3.41
September	3.58	11.34	9.28	4.03
October	2.32	0.26	12.49	3.5
November	5.85	1.53	1.68	4.96
December	3.74	0.67	1.2	3.63
Total	52.01	45.47	54.99	45.2

Reference www.wunderground.com

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Figure 3.1



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4.0 NEW CRICKET WATER FLOW

As expected, the water flow through New Cricket Spring responded to the high rainfall levels reported in Section 3.0. New Cricket water flow rates are recorded at the time of each sampling event. The reported monthly flow rates varied from less than one gallon per minute (gpm) (0.13 gpm) in September 2011 to 163 gpm in May 2011. During a period between April 19 and November 11, 2011, groundwater injection was discontinued resulting in summer flow rates in New Cricket Spring of approximately one gallon per minute in July, August and September and less than 10 gpm in June, October and November. New Cricket Spring water flows are presented in Section 4.0.

Figure 4.1 presents New Cricket Spring annual average water flows for 1996 through 2011. The water flows presented in Table 4.1 have been adjusted for the effect of injected water at the site. The injected water accounts for approximately 20 gallons per minute as measured at New Cricket Spring. The average flow at New Cricket Spring for the period from January to December 2011 was 27 gallons per minute. The 2011 average flow rate is consistent with the flow rates observed during the period 1996-2010. New Cricket Spring flows for the previous 15 years plus 2011 can be viewed on Figure 4.1.

The increased flow through New Cricket Spring since initiation of the pilot system for injection of ozonated and non-ozonated water into the flow channel of New Cricket Spring is believed to have enhanced the degradation of PCP. The increase in water flow is believed to have provided increased water flow throughout the affected zone of the Site. Normal historic water flows would have been expected during 2011 except for the additional flow provided by the injection system. The increased flow has also allowed for more consistent and manageable treatment during 2011. Analytical results for the past year are presented in Section 6.0.

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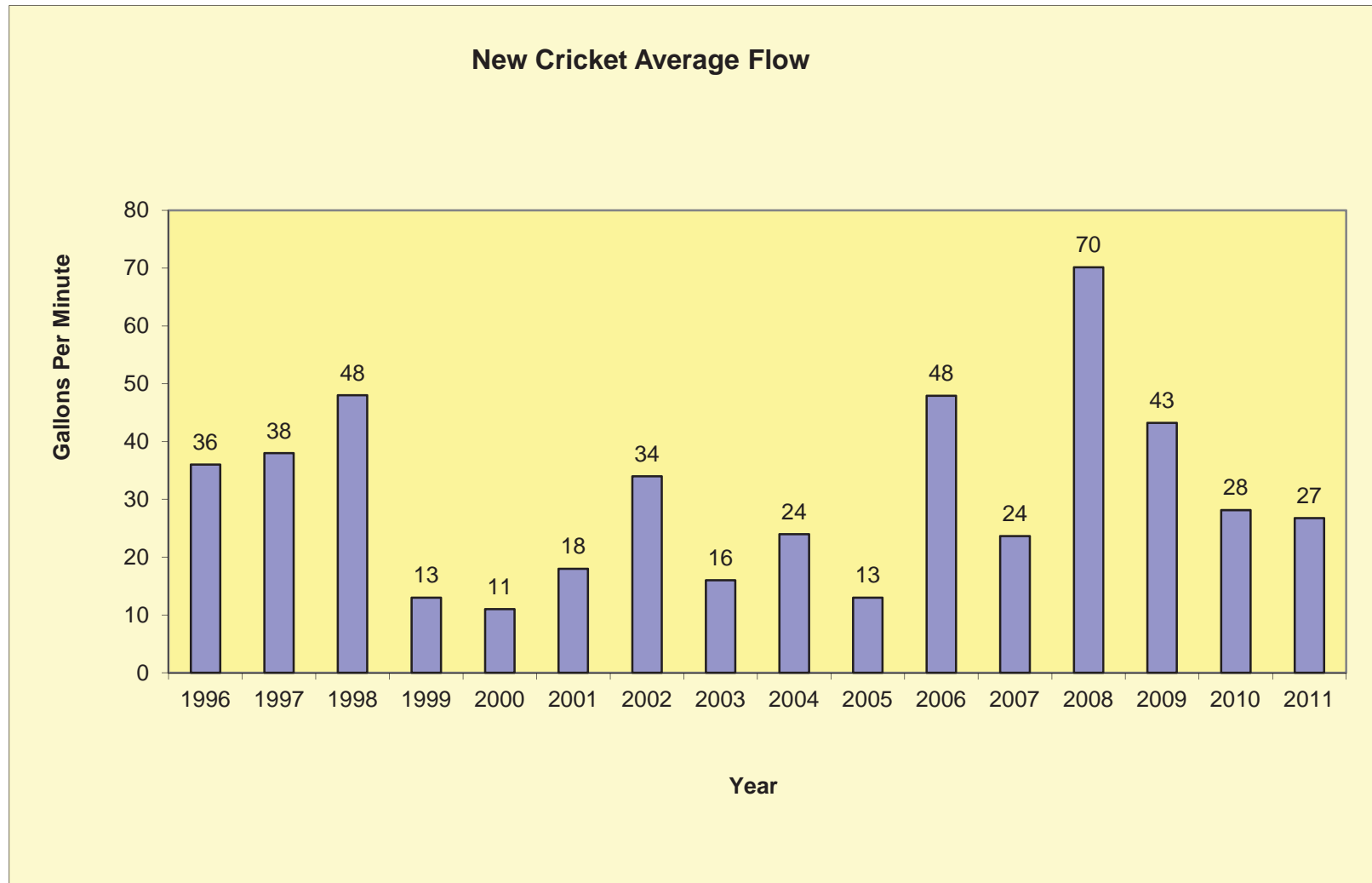
Table 4.1

New Cricket Spring
Average Flow Rates (gpm)
1996-2011

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
JAN		29	179	3	10	7	16	26	24	16	27	50	3	10	22	3
FEB		104	76	2	3	50	16	19	30	28	30	37	34	41	67	7
MAR		115	127	8	2	14	63	24	27	22	37	26	292	10	15	29
APR		42	36	5	8	5	70	15	22	12	54	27	104	121	20	38
MAY	15	18	40	8	5	5	59	22	23	9	41	21	23	177	160	163
JUN	6	21	9	84	8	5	95	20	16	2	10	21	285	12	23	7
JUL	12	12	9	6	84	17	18	12	21	6	19	19	67	27	13	1
AUG	7	12	20	6	1	8	8	5	17	7	17	1	9	4	0	1
SEP	50	16	12	5	1	6	8	2	12	13	24	21	13	2	13	0
OCT	12	13	20	9	1	10	8	10	32	23	43	18	1	84	0	24
NOV	127	30	12	6	2	9	27	22	50	8	234	18	7	25	1	10
DEC	58	41	33	13	4	74	23	17	12	25	39	25	4	8	4	40
AVG	36	38	48	13	11	18	34	16	24	13	48	24	70	43	28	27

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Figure 4.1



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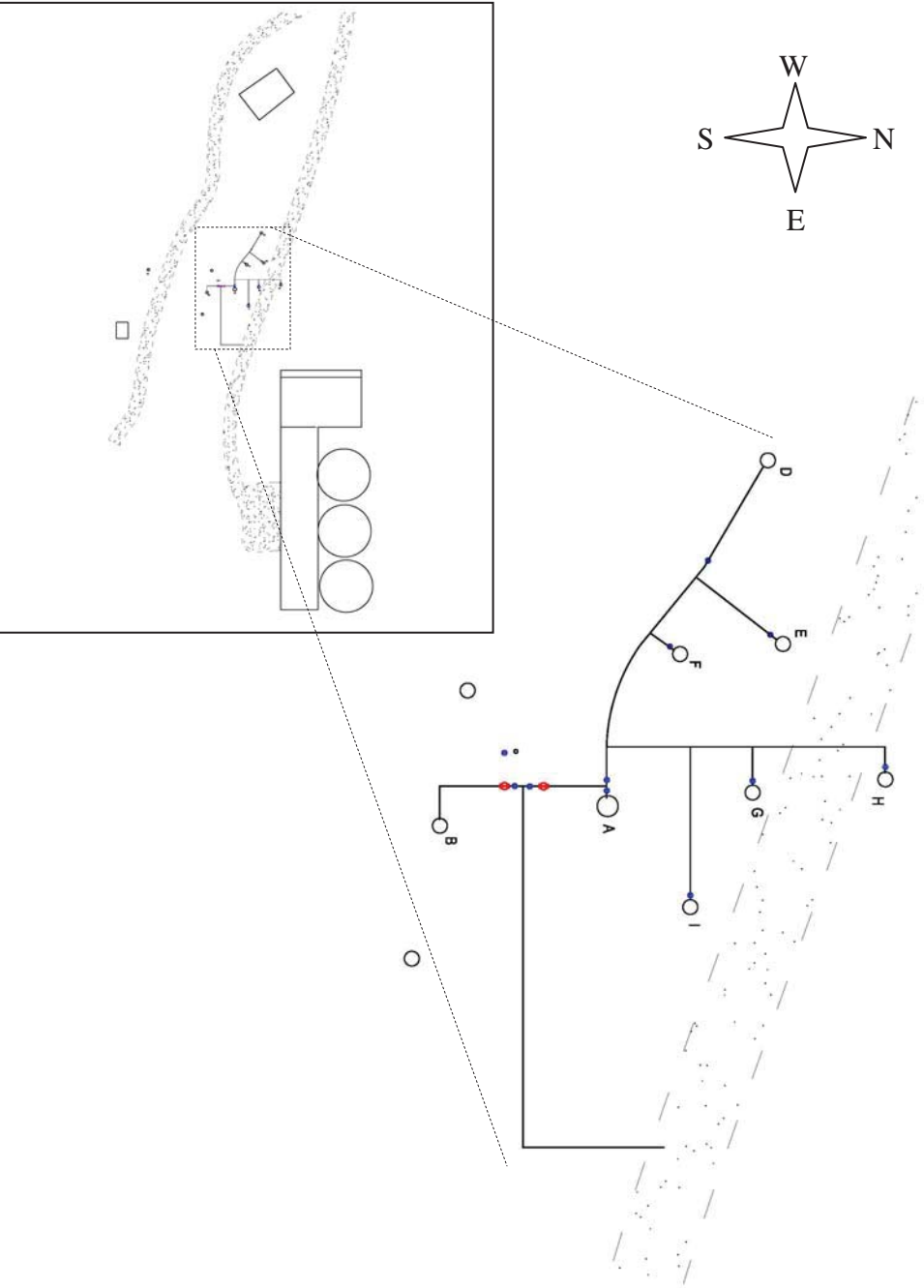
5.0 INJECTION WELLS

Nine injection points were installed in the vicinity of the former sinkhole on the main site. Most of the points only accept a limited amount of injected water and some of the wells will not accept any injected water. Non-ozonated water was primarily injected into Well A during 2011. Figure 5.1 depicts the layout of the injection wells.

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Figure 5.1

Injection well layout



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6.0 ANALYTICAL DATA

Water samples were collected for analytical testing on a monthly basis at the mouth of New Cricket Spring and at the weir of the outlet from the treatment system for the Arkwood site during 2011. Water emanating from New Cricket Spring continues to be treated with ozone in the Arkwood Primary Treatment System before being released to Cricket Creek. Analytical data collected during 2011 can be viewed in Table 6.1. Data from 2007 through 2010 is included in Appendix A.

All analytical data collected at the weir during 2011 was below five micrograms per liter (ug/L) or the method detection limit. For 10 months, the method detection limit was reported as 5.00 ug/L. The detection limit was reported at 10.00 ug/L in February and 2.00 ug/L in January. All collected samples were submitted to Arkansas Analytical, Inc. of Little Rock, Arkansas for analysis for PCP using EPA method 8070D. All analytical results were reported within acceptable quality control parameters.

Analytical results for samples collected at the mouth of New Cricket Spring ranged from 52.4 ug/L in June and November to less than 5.00 ppb (method detection limit) in September and 3.39 ug/L in January. Analytical results for samples collected at the mouth of New Cricket Spring were reported above the proposed cleanup levels for the Site during ten months in 2011. The proposed cleanup levels for the Arkwood site are established as an allowable monthly average of 9.3ug/l PCP and a daily maximum of 18.7 ug/l.

The ozonated portion of the pilot system was not operated in 2011. The pilot system was operated for a portion of the year as a water injection system to improve the water flows to New Cricket Spring. Non-ozonated water continues to be injected at the Site to provide continual flushing and efficient operation of the primary treatment system located at New Cricket Spring.

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Table 6.1 ARKWOOD ANALYTICAL DATA 2011

	Pilot Injection Flow	Pilot O3	NCS Flow	NCS-PCP ppb	Weir PCP ppb
1/18/11	37	0	22.83	3.39	2.86
2/9/11	37	0	26.76	10.4	<10.00
3/17/11	37	0	49.03	14.2	<5.00
4/19/11	37	0	57.55	12.5	<5.00
5/2/11	0	0	310	11	
5/3/11	0	0	271	8.92	
5/4/11	0	0	156	10.8	
5/4/11	0	0	123	15.8	
5/5/11	0	0	83	18	
5/9/11	0	0	34	43.8	<5.00
6/9/11	0	0	6.80	52.4	<5.00
7/18/11	0	0	0.575	18.6	<5.00
8/15/11	0	0	1.004	38.9	<5.00
9/13/11	0	0	0.132	<5.00	<5.00
10/18/11	0	0	23.71	52.4	<5.00
11/16/11	37	0	29.64	30.6	<5.00
12/16/11	37	0	60.25	11.5	<5.00

NOTES: Flow rates in gallons per minute (gpm)
 O3 injections rates in pounds per 10 gallons
 NCS – New Cricket Spring
 PCP concentrations in parts per billion (ppb)

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7.0 EQUIPMENT OPERATIONS

Equipment operations consisted of operating the pilot injection system, operating the primary treatment system adjacent to the mouth of New Cricket Spring, and maintenance of the facilities located at the Site. The primary treatment system continues to effectively treat the PCP that is present in New Cricket Spring prior to discharge to Cricket Creek. The pilot system effectively enhances the treatment by maintaining a more steady and consistent flow through the subsurface and to the New Cricket Spring. The effectiveness of the primary treatment system can be reviewed by reference to the analytical data collected at the discharge weir. The water at the weir is the effluent from the primary treatment system. Table 6.1 is a summary of the analytical data collected during this past year. The primary treatment system continues to operate efficiently for the Site.

Operation of the ozonated portion of the pilot system did not occur during 2011; however, injection of non-ozonated water continued during certain periods of the year.

It is believed that the water injection system has positively affected the operating characteristics of New Cricket Spring. During 2012, the operating plan will include continued water injection through the pilot system. The injection point used for the injection may be varied during the year to provide variation to the water flow path to the spring. Documentation will be maintained whenever injection well modifications occur.

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8.0 CONCLUSIONS

Annual rainfall totals exceeded the historical average. April and May rainfall totals greatly exceeded the historical average while January, June and July rainfall totals were reported well below the historical average. Injection of non-ozonated water occurred from January 1 through April 19 and November 11 through December 31. Very low natural flow rates were observed in July, August and September. Flow rates during these months were reported at approximately 1.00 gpm or less. Injection of non-ozonated water through the pilot system was shown to be effective in maintaining a base flow of water at New Cricket Spring and improve the effectiveness of the treatment system.

The Arkwood primary treatment system continued to effectively treat water at the outfall of New Cricket Spring prior to the release into Cricket Creek.

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**APPENDIX A ARKWOOD ANALYTICAL DATA
OCTOBER 2007 THROUGH 2010**

	Pilot Injection Flow	Pilot O3	NCS Flow	NCS-PCP ppb	Weir PCP ppb
10/10/07	35	2-3lb/10g	18	5.63	1.15J
10/22/07	35	2-4lb/10g	18	1190	53.7
11/5/07	35	2-4lb/10g	18	209	7.93
11/19/07	35	2-4lb/10g	18	19.8	24.1
12/3/07	35	2-4lb/10g	18	20.1	<5.00
12/17/07	35	2-4lb/10g	32	87.4	1.20J
1/7/08	35	2-4lb/10g	23	<5.00	<5.00
1/21/08	35	2-4lb/10g	23	58	<5.00
2/4/08	35	2-4lb/10g	24	52	<5.00
2/18/08	35	2-4lb/10g	83	57	15
3/3/08	35	5-6lb/10g	580	<5.00	<5.00
3/17/08	35	5-6lb/10g	44	11	<5.00
4/7/08	35	5-6lb/10g	78	10	<5.00
4/12/08	35	5-6lb/10g	240	6.5	NA
4/13/08	35	5-6lb/10g	100	6.8	NA
4/14/08	35	5-6lb/10g	78	8.2	NA
5/10/08	36	5-6lb/10g	68	75	<5.00
5/27/08	0	0	18	189	<5.00
6/9/08	35	2-4lb/10g	30	77	<5.00
6/23/08	35	2-4lb/10g	580	5.6	<5.00
7/7/08	35	2-4lb/10g	80	194	189
7/10/08	35	2-4lb/10g	140	254	20
7/21/08	35	2-4lb/10g	42	477	<5.00
8/4/08	35	2-4lb/10g	22	108	14
8/18/08	35	2-4lb/10g	36	31	<5.00
9/1/08	35	2-4lb/10g	25	32	<5.00
9/22/08	35	2-4lb/10g	40	22	<5.00
10/6/08	35	2-4lb/10g	21	20	<5.00
10/20/08	33	2-4lb/10g	21	13	<5.00
11/3/08	35	2-4lb/10g	24	<5.00	<5.00
11/17/08	35	2-4lb/10g	30	28	<5.00
12/1/08	35	2-4lb/10g	24	12	<5.00
12/22/08	33	2-4lb/10g	24	<5.00	<5.00
1/5/09	35	2-4lb/10g	32	7.3	<5.00
1/26/09	32	2-4lb/10g	27	<5.00	<5.00
2/9/09	33	2-4lb/10g	90	<5.00	<5.00

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2/23/09	33	2-4lb/10g	31	6	<5.00
3/9/09	34	2-4lb/10g	30	5.7	<5.00
3/23/09	33	2-4lb/10g	30	<5.00	<5.00
4/6/09	32	2-4lb/10g	38	5.8	<5.00
4/20/09	32	2-4lb/10g	243	8.5	<5.00
5/4/09	33	2-4lb/10g	343	8.2	8.7
5/18/09	33	2-4lb/10g	51	6.2	<5.00
6/8/09	35	2-4lb/10g	38	<5.00	<5.00
6/29/09	33	2-4lb/10g	25	9.1	<5.00
7/20/09	32	2-4lb/10g	47	39	<5.00
8/10/09	32	2-4lb/10g	23.7	31	<5.00
9/13/09	32	0	22	8	<5.00
10/12/09	32	0	104	21	<5.00
11/9/09	32	0	45	<50	<5.00
12/7/09	32	0	28	8.2	<5.00
1/10/10	32	0	42	13	<5.00
2/15/10	32	0	87	11.1	<5.00
3/15/10	32	0	35	<5.00	<5.00
4/15/10	32	0	40	9.62	<5.00
5/17/10	32	0	180	11	<5.00
6/13/10	32	0	43	15	<5.00
7/8/10	32	0	33	66	<2
8/19/10	0-20	0	17	16.3	<5.00
9/21/10	34	0	33	28.2	<5.00
10/18/10	37	0	20	14.9	<10.00
11/20/10	37	0	21	4.89	<4.00
12/16/10	37	0	24	6.15	<5.00

NOTES: Flow rates in gallons per minute (gpm)
 O3 injections rates in pounds per 10 gallons
 NCS – New Cricket Spring
 PCP concentrations in parts per billion (ppb)
 NA – not analyzed
 LE – Lab Error – samples not usable

Figure 1: Arkwood Inc. Site Location and General Area Map

